UNITED STATES DISTRICT COURT
DISTRICT OF MASSACHUSETTS

SINGULAR COMPUTING LLC,	)	
Plaintiff,	)	**Civil Action No. 19-12551-FDS**
v.	)	
GOOGLE LLC,	)	
Defendant.	)	

MEMORANDUM AND ORDER ON DEFENDANT'S MOTION TO DISMISS

SAYLOR, C.J.

This is a patent infringement dispute concerning computer system architectures. U.S. Patent Nos. 8,407,273 ("the '273 Patent"), 9,218,156 ("the '156 Patent"), and 10,416,961 ("the '961 Patent"), held by plaintiff Singular Computing LLC, each describe a method of "Processing with Compact Arithmetic Processing Element[s]." Singular has brought suit for infringement of the three patents, including allegations of willful infringement and a request for treble damages, against defendant Google LLC.

Google has moved to dismiss the amended complaint, contending that the patents-in-suit claim fundamental and abstract ideas that are not patentable under 35 U.S.C. § 101. For the reasons set forth below, the motion will be denied.

I. Background

A. Factual Background

The facts are stated as set forth in the amended complaint ("AC") unless otherwise noted.

1. Singular Computing

Singular Computing is a Delaware limited liability company based in Newton and

Cambridge, Massachusetts. (AC ¶ 1). It was founded by Joseph Bates, Ph.D., in order to develop computers with novel architectures. (*Id.* ¶ 6). Those architectures include processors with parts "designed to perform low precision and high dynamic range (LPHDR) arithmetic operations." (*Id.* ¶ 9). According to the complaint, such architectures "allow [] for more efficient use of a computer's transistors," which improves computer performance in certain applications such as artificial intelligence software. (*Id.* ¶¶ 9-12).

2. The '273 Patent

The '273 Patent is entitled "Processing with Compact Arithmetic Processing Element" and was issued on March 26, 2013. It generally relates to "a processor or other device" that "includes processing elements designed to perform arithmetic operations . . . on numerical values of low precision but high dynamic range." ('273 Patent col. 2 ll. 11-18). In other words, those LPHDR processing elements often "produce results that frequently differ from exact results" by a margin of error, but "they are capable of operating on inputs and/or producing outputs spanning a range" of numbers that is relatively large. (*See id.* col. 2 ll. 28-39).

According to the patent, conventional central processing units ("CPUs") perform arithmetical operations, such as addition, subtraction, multiplication, and division, "with great precision," which typically requires "on the order of a million transistors." (*Id.* col. 3 ll. 7-22). Although such CPUs "make inefficient use of their transistors," this high-precision architecture remains the norm because "[m]any applications need this kind of precision" and it preserves "software compatibility with earlier designs." (*Id.*; *see also id.* col. 5 ll. 41-62).

Because of the inefficiency of conventional CPU designs, "other kinds of computers have been developed to attain higher performance." (*Id.* col. 3. ll. 31-32). The patent describes a variety of such architectures, including single instruction stream/multiple data stream designs, field programmable gate arrays, and graphics processing units ("GPUs"). (*See generally id.* col.

3 l. 30-col. 5 l. 62). The patent claims that while many of those architectures use lower-precision arithmetic and may have advantages for specialized applications, they suffer from a variety of flaws that either prevent their use for modern general-purpose computing or render them approximately as inefficient as conventional CPU designs. (*See generally id.*).

The ’273 Patent purports to take a “fundamentally different approach” from prior architectures by incorporating LPHDR processing elements into computer processors or other devices. (*Id.* col. 5 l. 63-col. 6 l. 2). According to the patent, each individual LPHDR processing element is “relatively small,” which enables them to be deployed together in “massively parallel” configurations. (*Id.* col. 6 ll. 51-55). And the patent claims that while persons of ordinary skill in the art commonly believe that such “massive amounts of LPHDR arithmetic” are of little use, they “are in fact useful and provide significant practical benefits in at least several significant applications.” (*Id.* col. 6 l. 51-col. 7 l. 11). For example, it claims that processors with multiple LPHDR processing elements can efficiently solve a task known as the nearest neighbor problem, which has applications in compressing or comparing various types of data. (*Id.* col. 17 l. 29-col. 21 l. 32).

3. The ’156 & ’961 Patents

The ’156 Patent and ’961 Patent are also both entitled “Processing with Compact Arithmetic Processing Element.” The ’156 Patent was issued on December 22, 2015, and is a continuation of the ’273 Patent. The ’961 Patent was issued on September 17, 2019, and is a continuation of the ’156 Patent.[1] Both the ’156 Patent and the ’961 Patent share a specification with the ’273 Patent.

[1] To be precise, the ’961 Patent is a continuation of U.S. Pat. No. 10,120,648, which is a continuation of U.S. Pat. No. 9,792,088, which is a continuation of the ’156 Patent.

4. Google, LLC

Google, LLC is a Delaware limited liability company. Among other things, it provides consumers with a variety of internet-based computer services such as Google Search, Google Translate, Google Photos, Google Assistant, and Gmail. (*See* AC ¶¶ 2, 15). The amended complaint alleges that Google has built and used several computer systems for its own data centers that infringe on the '273, '156, and '961 Patents. (*Id.* ¶¶ 16-26, 81-132).

B. Procedural Background

On December 20, 2019, Singular filed this action. The amended complaint was filed on March 20, 2020. It alleges three counts against Google: infringement of the '273 Patent (Count 1); infringement of the '156 Patent (Count 2); and infringement of the '961 Patent (Count 3).

On April 17, 2020, Google moved to dismiss the amended complaint under Fed. R. Civ. P. 12(b)(6) for failure to state a claim upon which relief can be granted.

II. Legal Framework

A. Legal Standard

On a motion to dismiss made pursuant to Rule 12(b)(6), the court "must assume the truth of all well-plead[ed] facts and give . . . plaintiff the benefit of all reasonable inferences therefrom." *Ruiz v. Bally Total Fitness Holding Corp.*, 496 F.3d 1, 5 (1st Cir. 2007) (citing *Rogan v. Menino*, 175 F.3d 75, 77 (1st Cir. 1999)). To survive a motion to dismiss, the complaint must state a claim that is plausible on its face. *Bell Atl. Corp. v. Twombly*, 550 U.S. 544, 570 (2007). In other words, the "[f]actual allegations must be enough to raise a right to relief above the speculative level, . . . on the assumption that all the allegations in the complaint are true (even if doubtful in fact)." *Id.* at 555 (citations omitted). "The plausibility standard is not akin to a 'probability requirement,' but it asks for more than a sheer possibility that a defendant has acted unlawfully." *Ashcroft v. Iqbal*, 556 U.S. 662, 678 (2009) (quoting *Twombly*,

550 U.S. at 556). Dismissal is appropriate if the complaint fails to set forth "factual allegations, either direct or inferential, respecting each material element necessary to sustain recovery under some actionable legal theory." *Gagliardi v. Sullivan*, 513 F.3d 301, 305 (1st Cir. 2008) (quoting *Centro Médico del Turabo, Inc. v. Feliciano de Melecio*, 406 F.3d 1, 6 (1st Cir. 2005)).

Whether a claim is drawn to patent-eligible subject matter under § 101 is an issue of law. *Genetic Techs. Ltd. v. Merial LLC*, 818 F.3d 1369, 1373 (Fed. Cir. 2016). Accordingly, courts have occasionally decided the issue of § 101 patentability at the pleadings stage. *See, e.g.*, *Rothschild Digital Confirmation, LLC v. Skedulo Holdings Inc.*, 2020 WL 1307016 (N.D. Cal. Mar. 19, 2020). However, "like many legal questions," determining eligibility under § 101 can involve "subsidiary fact questions"—in particular, the second step of the *Alice*/*Mayo* test, which asks whether a patent's claims contain a sufficiently inventive concept. *Aatrix Software, Inc. v. Green Shades Software, Inc.*, 882 F.3d 1121, 1128 (Fed. Cir. 2018). Therefore, while the Federal Circuit has held that "patent eligibility can be determined at the Rule 12(b)(6) stage," it has also cautioned that "[t]his is true only when there are no factual allegations that, taken as true, prevent resolving the eligibility question as a matter of law." *Id.* at 1125.

B. Statutory Framework

An invention is generally patentable if it qualifies as a "new and useful process, machine, manufacture, or composition of matter." 35 U.S.C. § 101. However, "this provision contains an important implicit exception. Laws of nature, natural phenomena, and abstract ideas are not patentable." *Mayo Collaborative Servs. v. Prometheus Labs.*, 566 U.S. 66, 70 (2012) (citing *Diamond v. Diehr*, 450 U.S. 175, 185 (1981)). In applying this exception, a court "must distinguish between patents that claim the building blocks of human ingenuity and those that integrate the building blocks into something more." *Alice Corp. Pty. Ltd. v. CLS Bank Intern.*, 573 U.S. 208, 217 (2014) (internal quotations omitted).

The framework for making that distinction involves a two-step process. At step one, the court determines "whether the claims at issue are directed to one of those patent-ineligible concepts" that is so abstract as to "risk disproportionately tying up the use of [] underlying ideas." *Alice*, 573 U.S. at 217 (quoting *Mayo*, 566 U.S. at 73). If step one is answered affirmatively, the court continues to step two. At step two, the court looks for an "inventive concept," namely "an element or combination of elements that is sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the ineligible concept itself." *Id.* at 217-18 (internal quotations omitted). If step two is also answered affirmatively, then the patent claims subject matter that is not patentable and is therefore invalid.

III. Analysis

A. The Representative Claims

As an initial matter, the Court must determine which claims of the '273, '156, and '961 Patents to analyze to resolve the pending motion. The amended complaint asserts infringement as to several claims of each patent. (*See* AC ¶¶ 87, 104, 122). But it also alleges that three of those claims are representative: claim 53 of the '273 Patent, claim 7 of the '156 Patent, and claim 4 of the '961 Patent. (*Id.* ¶¶ 31, 47, 64). Google does not dispute that those three claims are representative. (*See* Def. Mem. at 6). Accordingly, the Court may assess whether the asserted claims are invalid under § 101 based on those claims. *See Berkheimer v. HP Inc.*, 881 F.3d 1360, 1365 (Fed. Cir. 2018).

Claim 53 of the '273 Patent recites:

> A device:
>
> comprising at least one first low-precision high-dynamic range (LPHDR) execution unit adapted to execute a first operation on a first input signal representing a first numerical value to produce a first output signal representing a second numerical value;

wherein the dynamic range of the possible valid inputs to the first operation is at least as wide as from 1/1,000,000 through 1,000,000 and for at least X=5% of the possible valid inputs to the first operation, the statistical mean, over repeated execution of the first operation on each specific input from the at least X % of the possible valid inputs to the first operation, of the numerical values represented by the first output signal of the LPHDR unit executing the first operation on that input differs by at least Y=0.05% from the result of an exact mathematical calculation of the first operation on the numerical values of that same input;

wherein the number of LPHDR execution units in the device exceeds by at least one hundred the non-negative integer number of execution units in the device adapted to execute at least the operation of multiplication on floating point numbers that are at least 32 bits wide.

('273 Patent at col. 31 l. 62-col. 32 l. 18, col. 32 ll. 37-41, 60-62; AC ¶ 31).

Next, claim 7 of the '156 Patent recites:

A device comprising:

at least one first low precision high-dynamic range (LPHDR) execution unit adapted to execute a first operation on a first input signal representing a first numerical value to produce a first output signal representing a second numerical value,

wherein the dynamic range of the possible valid inputs to the first operation is at least as wide as from 1/1,000,000 through 1,000,000 and for at least X=5% of the possible valid inputs to the first operation, the statistical mean, over repeated execution of the first operation on each specific input from the at least X % of the possible valid inputs to the first operation, of the numerical values represented by the first output signal of the LPHDR unit executing the first operation on that input differs by at least Y=0.05% from the result of an exact mathematical calculation of the first operation on the numerical values of that same input; and

at least one first computing device adapted to control the operation of the at least one first LPHDR execution unit

wherein the at least one first computing device comprises at least one of a central processing unit (CPU), a graphics processing unit (GPU), a field programmable gate array (FPGA), a microcode-based processor, a hardware sequencer, and a state machine; and,

wherein the number of LPHDR execution units in the device exceeds by at least one hundred the non-negative integer number of execution units in the device adapted to execute at least the operation of multiplication on floating point numbers that are at least 32 bits wide.

('156 Patent at col. 29 l. 54-col. 30 l. 17, col. 30 ll. 21-23; AC ¶ 47).

Finally, claim 4 of the '961 Patent recites:

> A device comprising:
>
> at least one first low precision high-dynamic range (LPHDR) execution unit adapted to execute a first operation on a first input signal representing a first numerical value to produce a first output signal representing a second numerical value,
>
> wherein the dynamic range of the possible valid inputs to the first operation is at least as wide as from 1/1,000,000 through 1,000,000 and for at least X=10% of the possible valid inputs to the first operation, the statistical mean, over repeated execution of the first operation on each specific input from the at least X % of the possible valid inputs to the first operation, of the numerical values represented by the first output signal of the LPHDR unit executing the first operation on that input differs by at least Y=0.2% from the result of an exact mathematical calculation of the first operation on the numerical values of that same input;
>
> at least one first computing device adapted to control the operation of the at least one first LPHDR execution unit;

('961 Patent at col. 30 ll. 17-37, 49-51; AC ¶ 64).

B. Whether the Claims Are Directed to a Patent-Ineligible Abstract Concept

The Court must first determine if the claims in question are "directed to" a patent-ineligible abstract idea.[2]

"At some level, all inventions . . . embody, use, reflect, rest upon, or apply laws of nature, natural phenomenon, or abstract ideas." *Alice*, 573 U.S. at 217 (quotations omitted). Accordingly, "it is not enough to merely identify a patent-ineligible concept underlying the claim; [the court] must determine whether that patent-ineligible concept is what the claim is directed to." *Thales Visionix Inc. v. United States*, 850 F.3d 1343, 1349 (Fed. Cir. 2017) (internal quotations omitted). In pursuing that inquiry, "the claims are considered in their

[2] For the sake of simplicity, the Court will use the term "abstract idea" to describe non-patentable subject matter, although the label is imprecise and the prohibition also extends to matters such as "laws of nature" and "natural phenomena." *See Mayo*, 566 U.S. at 70.

entirety to ascertain whether their character as a whole is directed to excluded subject matter." *Internet Patents Corp. v. Active Network Inc.*, 790 F.3d 1343, 1346 (Fed. Cir. 2015). Although "the specification may . . . be useful in illuminating whether the claims are 'directed to' the identified abstract idea . . . any reliance on the specification in the § 101 analysis must always yield to the claim language." *ChargePoint, Inc. v. SemaConnect, Inc.*, 920 F.3d 759, 767-69 (Fed. Cir. 2019) (internal citations omitted).

Delineating the bounds of the "abstract ideas" category has proved somewhat elusive. At one end of the spectrum, the caselaw makes clear that algorithms and mathematical formulas expressing "fundamental truth[s]" are squarely within the realm of unpatentable abstract ideas. *See Alice*, 573 U.S. at 218-220 (citing *Gottschalk v. Benson*, 409 U.S. 63 (1972); *Parker v. Flook*, 437 U.S. 584 (1978)). However, abstract ideas are not limited to "preexisting, fundamental truths that exist in principle apart from any human action." *Id.* at 220 (internal quotations omitted). A patent merely covering an application of an otherwise general practice, even a complex practice, may be directed to an abstract idea. *See, e.g.*, *Bilski v. Kappos*, 561 U.S. 593, 611 (2010) (holding that "[t]he concept of hedging [financial transactions]" was a patent-ineligible "abstract idea, just like the algorithms at issue in *Benson* and *Flook*").

No clear boundaries have been drawn around the category of ineligible abstract ideas. In fact, the Supreme Court has rejected the creation of categorical rules for determining patent-ineligible subject matter in favor of resolving cases narrowly. *See id.* at 609 (refusing to conclude that business-process claims at issue were categorically unpatentable). Instead, courts "have found it sufficient to compare claims at issue to those claims already found to be directed to an abstract idea in previous cases." *Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327, 1334 (Fed. Cir. 2016); *see also Alice*, 573 U.S. at 221 ("[W]e need not labor to delimit the precise

contours of the 'abstract ideas' category in this case. It is enough to recognize that there is no meaningful distinction between the concept of risk hedging in *Bilski* and the concept of intermediated settlement at issue here. Both are squarely within the realm of 'abstract ideas' as we have used that term."). The claims at issue must therefore be placed in context within the caselaw.

Singular contends that the claims are "directed to an improvement to computer functionality" and therefore patent eligible." (Pl. Opp. at 6; *see also* AC ¶¶ 46, 63, 77). Indeed, the Supreme Court has suggested that claims are patent-eligible if they "purport to improve the functioning of the computer itself." *Alice*, 573 U.S. at 225. And while the Supreme Court discussed such improvements to computer functionality at step two of the inquiry, the Federal Circuit has concluded that improvements of that kind are not "inherently abstract" and should be analyzed at the first step. *Enfish*, 822 F.3d at 1335. Accordingly, the Federal Circuit has held that if a patent generally relates to computer-functionality improvements, then "the first step in the *Alice* inquiry asks whether the focus of the claims is on the specific asserted improvement in computer capabilities . . . or, instead, on a process that qualifies as an 'abstract idea' for which computers are invoked merely as a tool." *Id.* at 1335-36. If the claims are "directed to 'an improvement to computer functionality itself, not on economic or other tasks for which a computer is used in its ordinary capacity,'" then they are not directed to an abstract idea and are patent-eligible. *Cellspin Soft, Inc. v. Fitbit, Inc.*, 927 F.3d 1306, 1315 (Fed. Cir. 2019) (quoting *id.*); *see also Aatrix*, 882 F.3d at 1127 (Fed. Cir. 2018) (collecting cases).

Google contends that the claims at issue are not directed to improvements in computer functionality, but rather to LPHDR arithmetic, which it summarizes as the "abstract idea of doing an arithmetic calculation with an intended degree of imprecision." (Def. Mem. at 11-12). It

further contends that applying that idea to numbers that have a high dynamic range is "equally abstract," because the idea of high dynamic range "is, literally, just mathematics, and it is completely abstract." (*Id.* at 10).

Whether that is true raises issues of claim construction. Google describes LPHDR arithmetic in fairly general terms. In its view, "'low precision' means the execution unit is not adapted to calculate the precisely correct mathematical result every time," and "'high dynamic range' means only that the execution unit can represent a relatively broad range of numbers.'" (Def. Mem. at 11-12). But Singular proposes a narrower construction, defining "low precision" and "high dynamic range" as they are set forth in the claims with "very precise limitations." (Pl. Opp. at 8). Indeed, the claims themselves set specific parameters for what constitutes low precision and high dynamic range. For example, claim 53 of the '273 Patent sets forth particular minimum levels of precision and specifies a dynamic range "at least as wide as from 1/1,000,000 through 1,000,000." ('273 Patent at col. 32 ll. 1-12, 60-62).[3] In short, the parties dispute how narrowly the claims define LPHDR arithmetic.

That dispute may affect the § 101 analysis. The Federal Circuit has held that "[i]f there are claim construction disputes at the Rule 12(b)(6) stage . . . the court must proceed by adopting the non-moving party's constructions." *Aatrix*, 882 F.3d at 1125.[4] Adopting Singular's construction of the claims would limit them to particular precision and dynamic range parameters, as opposed to the notion of LPHDR arithmetic more broadly. And limiting the

[3] Claim 7 of the '156 Patent sets forth identical parameters for precision and dynamic range. Claim 4 of the '961 Patent sets forth slightly different parameters, although they are still specified exactly.

[4] The Federal Circuit has advised that if claim-construction disputes arise on a Rule 12(b)(6) motion, a court may also "resolve the disputes to whatever extent is needed to conduct the § 101 analysis, which may well be less than a full, formal claim construction." *Aatrix*, 882 F.3d at 1125. Google does not contend that solution is appropriate here.

preemptive effect of the claims in that manner bolsters Singular's argument that they are directed to improving computer functionality by proposing a particular computing architecture with particular specifications, rather than more broadly to the "notion of doing less precise calculations." (Def. Mem. at 10). *See ChargePoint, Inc.*, 920 F.3d at 766 (explaining that step one of the *Alice* inquiry asks "whether a claim is truly focused on an abstract idea . . . whose use the patent law does not authorize anyone to preempt").[5] Thus, questions of claim construction—specifically, of determining what limitations exist for the "low precision" and "high dynamic range" arithmetic performed by the LPHDR processing elements—preclude granting Google's motion to dismiss.

Google contends that the claims are directed to an abstract concept even if the court adopts Singular's construction. Because the claims "do not require any particular architecture for the LPHDR unit," it says, they "would impermissibly monopolize" any device "that does arithmetic in a way that leads to the error rates in the claim and can do calculations across the specified dynamic ranges." (Def. Reply at 5, 7-8). But what limiting effect those particular error rates and dynamic ranges have on the claims is not clear on this record.[6] It may be that they are specific enough to sufficiently limit the claims, or it may be that they cover an impermissibly broad range of devices, as Google contends. Making that determination requires further development of the factual record.

[5] Google contends that these limitations do not demonstrate patent eligibility because the patents' specification admits that such precision and dynamic range parameters may vary. (Def. Mem. at 19-20; *see* '273 Patent at 27:5-7). But because it is the claim language, rather than the specification, that "defines the breadth of each claim," those general statements in the specification must yield to the claim language when identifying "the true focus of a claim." *ChargePoint*, 920 F.3d at 766.

[6] Similarly, it is not currently clear whether those parameters—or the number of LPHDR units set forth in claims 53 and 7—supply "the specificity required to transform a claim from one claiming only a result to one claiming a way of achieving it." *Compare Ericsson Inc. v. TCL Commc'n Tech. Holdings Ltd.*, 955 F.3d 1317, 1328 (Fed. Cir. 2020) (quoting *SAP Am., Inc. v. InvestPic*, LLC, 898 F.3d 1161, 1167 (Fed. Cir. 2018)).

In any event, even setting aside the issues with claim construction, and assuming that the claims are directed to a patent-eligible abstract concept, there are questions of fact at the second step of the analysis that preclude dismissal under Rule 12(b)(6).

C. Whether the Claims Lack a Sufficiently Inventive Concept for Patentability

If the asserted claims of a patent are directed to an abstract idea, they must be examined for an "inventive concept sufficient to transform the claimed abstract idea into a patent-eligible application." *Alice*, 573 U.S. at 221 (quotations omitted).

That examination requires the court to "consider the elements of each claim both individually and as an ordered combination." *Id.* at 217. The inquiry searches for "an element or combination of elements that is sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the ineligible concept itself." *Id.* at 217-18 (internal quotations omitted). "An inventive concept reflects something more than the application of an abstract idea using 'well-understood, routine, and conventional activities previously known to the industry.'" *Cellspin*, 927 F.3d at 1316 (Fed. Cir. 2019) (quoting *Alice*, 573 U.S. at 225)). "The question of whether a claim element or combination of elements is well-understood, routine and conventional to a skilled artisan in the relevant field is a question of fact." *Berkheimer*, 881 F.3d at 1368.

Here, the amended complaint alleges how the computer architectures claimed by the patents-in-suit were unconventional. For example, it alleges that the device of claim 53 of the '273 Patent "substantially differs structurally from devices in the prior art" because it includes LPHDR processing elements with particular parameters of precision and dynamic range. (*See* AC ¶ 42). It alleges that by contrast, previous computing architectures, such as GPUs, did not include any such processing elements. (*Id.*). In fact, the amended complaint alleges, building the device of claim 53 "required the design and manufacture of hardware different from the

hardware used in conventional processing units, because conventional hardware at that time was completely unsuitable to implement the invention." (*Id.* ¶ 43). Moreover, it alleges that "by deploying massive numbers of LPHDR execution units in conjunction with far smaller numbers of higher precision processing elements"—at least 100 fewer, to be precise—the device of claim 53 "can execute a far larger number of operations per period than a conventional computer" while "support[ing] operations performed at a wider range of precisions and dynamic ranges." (AC ¶¶ 45-46). In discussing the other representative claims, the amended complaint makes similar allegations—specifically, that they incorporated LPHDR processing elements in a way that differed from and improved upon traditional computing architectures. (*See* AC ¶¶ 59-63, 73-80). Accepting all of those allegations as true, as the Court must, they suggest that even if the claims are directed to an abstract idea (LPHDR arithmetic), the particular way in which they incorporated that idea into existing computer processing architecture was unconventional. *See Cellspin*, 927 F.3d at 1316-18.

Google contends that those architectural arrangements "existed in preexisting, conventional implementations" of computer processors, and that the patents' own specification confirms this. (Def. Mem. at 18-20).[7] It is true that the specification describes prior computing architectures with features that appear broadly similar. For example, it explains that some existing computers of a single instruction stream/multiple data stream ("SIMD") design already "distribute data across a grid of processing elements," some of which use small bit widths, allowing "more of them to fit in the computer." ('273 Patent at col. 3 ll. 40-62). Similarly, it

[7] Google also contends that two other features alleged in the amended complaint—the use of logarithmic number system arithmetic or floating-point number system arithmetic, each at a particular bit width—are neither unconventional nor claimed by the patents. (Def. Mem. at 14-17). Because the Court concludes that the amended complaint adequately alleges that the claimed architectural features were unconventional, it does not reach that question here.

notes that conventional GPU devices are a pre-existing "variety of parallel processor" with "thousands of nearly identical threads of computing" that sometimes use lower-precision number formats. (*See id.* at col. 4 l. 64-col. 5 l. 30). However, it also notes shortcomings with those prior architectures that supposedly distinguish them from the claimed invention. (*See id.* at col. 4 ll. 7-23 (describing "limitations" in some types of SIMD computers that made them unsuitable "as a general purpose computer"); col. 5 ll. 31-40 (explaining how conventional GPUs are "wasteful of transistors" in the same way as conventional CPUs)).

In any event, the amended complaint sufficiently alleges that the claimed elements are inventive. As set forth above, it describes how the claimed invention's design and use of LPHDR processing elements supposedly varies from conventional practice. (*See, e.g.*, AC ¶¶ 42, 43, 45-46). And the Federal Circuit has treated "allegations in the *complaint*" as sufficient to demonstrate that claims "were potentially inventive." *Cellspin*, 927 F.3d at 1317 (citing *Aatrix*, 882 F.3d at 1128). "As long as what makes the claims inventive is recited by the claims, the specification need not expressly list all the reasons why this claimed structure is unconventional." *Id.*

Here, the claims recite the features that supposedly make them inventive—namely, the specified precision and dynamic-range parameters for LPHDR processing elements and the inclusion of at least 100 more such units than conventional processing elements in the claimed computing architecture. (*See, e.g.*, '273 Patent at col. 31 l. 62-col. 32 l. 18, col. 32 ll. 37-41, 60-62). Google questions whether those features are truly inventive, rather than merely a set of "entirely arbitrary" specifications. (Def. Mem. at 19-20). But the amended complaint alleges that they were both novel and an improvement to existing computer architecture, and at this

stage, the Court must accept those allegations as true.[8] Therefore, because the amended complaint contains "plausible and specific factual allegations that [those] aspects of the claims are inventive," it is sufficient to survive a motion to dismiss. *Cellspin*, 927 F.3d at 1317.

In summary, the Court cannot conclude at this juncture that the patents-in-suit recite unpatentable subject matter under 35 U.S.C. § 101 and are therefore invalid. Accordingly, Google's motion to dismiss will be denied.

IV. Conclusion

For the foregoing reasons, the motion of defendant Google LLC to dismiss for failure to state a claim upon which relief can be granted is DENIED.

So Ordered.

/s/ F. Dennis Saylor IV
F. Dennis Saylor IV
Chief Judge, United States District Court

Dated: June 25, 2020

[8] Google further contends that the "specification disclaims the significance of any particular level of imprecision." (Def. Mem. at 20 (citing '273 Patent at col. 27 ll. 54-62). But even if that is true, the amended complaint does allege that the particular parameters set forth in the claims at issue are inventive. (*See, e.g.*, AC ¶ 42). Because those allegations have some support in the claims, which recite those same parameters, they must be taken as true. *See Cellspin*, 927 F.3d at 1317 (explaining that "plausible and specific factual allegations that aspects of the claims are inventive are sufficient").